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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,780	09/29/2003	Takashi Kanai	F-7987	2486

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EXAMINER	
MULLINS, BURTON S	

ART UNIT	PAPER NUMBER
2834	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/673,780	KANAI ET AL.	
	Examiner	Art Unit	
	Burton S. Mullins	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *19-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *19,20,24 and 28-36* is/are rejected.

7)☐ Claim(s) *21-23 and 25-27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 19 and 28 are objected to because of the following informalities: In claims 19 and 28, insert –a—before "cylindrically shaped". In claim 28, "said shaft" lacks antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 19-20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lieu et al. (US 6,844,636) in view of Sedgewick (US 4,331,896) and Murabe et al. (US 6,307,295).

Lieu teaches a spindle motor comprising: a base assembly including: a base plate 72 (Fig.13); a shaft 76 fixed to said base plate; a coil 81 fixed to said base plate configured as a cylindrically shaped coil which is coreless; a hub assembly including: a hub member 78 covering an upper part of said shaft; a sleeve 79 fixed to said hub member and surrounding an outer circumference of said shaft 76 to define a gas volume separating said sleeve and said shaft (a "gas volume" or air space exists between sleeve 79 and shaft 76, see Fig.13); a rotor fixed to said hub member 78 and including a plurality of magnets 73 cylindrically arranged; and a back yoke (flux ring) 75 fixedly connected to said rotor via said hub member 78 and arranged in fixed opposition to said rotor with said coil 81 disposed between said back yoke and said rotor so as to define a magnetic circuit outside said sleeve and said shaft (Fig.13).

Lieu does not teach: 1) a continuous waveform stator coil; 2) that the sleeve and shaft are configured to form a radial aerodynamic bearing; and 3) that first and second magnets are respectively connected to the sleeve and shaft and configured to form an axial thrust bearing.

Regarding feature (1), Sedgewick teaches a coreless "torquer" stator coil comprising a continuous waveform 20 (Figs.3-4). Sedgewick's coil provides a multi-pole, single- or multi-phase coil array with a self-supporting structure with reduced manipulation during manufacture (c.2:12-17).

Regarding features (2) and (3), Murabe teaches a spindle motor including a stationary sleeve 13 and a rotating shaft 12 (Fig.3) with grooves formed in the sleeve and/or the shaft (Figs.5A-5C) to thus provide a radial dynamic pressure or "aerodynamic" [sic] bearing as a means of supporting the shaft (c.3:36-38; c.7:5-10). Murabe further teaches first and second magnets 15/18 and 16/19 respectively connected to said sleeve 13 and said shaft 12 and configured to form an axial thrust bearing (c.3:36-38 & 44-57; Fig.3).

It would have been obvious to modify Lieu and provide a continuous waveform stator coil per Sedgewick to provide a multi-pole, single- or multi-phase coil array with a self-supporting structure with reduced manipulation during manufacture, and further to provide a radial aerodynamic bearing between sleeve and shaft and first and second magnets forming an axial thrust bearing per Murabe since these respective elements would have been desirable to support the shaft radially and axially.

Regarding claim 20, in Lieu the rotor, i.e. magnet 73, is disposed radially inward of said coil 81 and said back yoke 75 is disposed radially outward of said coil (Fig.13).

Regarding claim 24, although in Lieu the rotor is inward of the coil and the back yoke is outward of the coil, re-arranging these parts such that the rotor is outward and the back yoke inward would have been an obvious matter of engineering design since re-arrangement of parts has been held to involve ordinary skill and would not effect operation of the magnetic circuit. In re Japikse, 86 USPQ 70.

4. Claims 29-30, 32-34 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hall et al. (US 4,731,554) in view of Sedgewick (US 4,331,896) and Murabe et al. (US 6,307,295). Hall teaches a motor comprising: a base assembly including a base plate (housing) 12 (Fig.1); a sleeve (bearing support) 14 fixed to said base plate 12; a coil 24 fixed to said base plate and configured as cylindrically shaped (Figs.1&3); a hub assembly (corresponding to "rotor" 20) including a hub member (not numbered, Fig.1) covering an upper part of said shaft 16; a shaft 16 having an upper end fixed to said hub member (Fig.12) and having an outer circumference thereof surrounded by said sleeve 14 to define a gas volume separating said sleeve and said shaft (inherent, Fig.1); a rotor fixed to said hub member 20 and including a plurality of magnets 22 cylindrically arranged; and a back yoke (backup ring) 38 fixedly connected to said rotor via said hub member arranged in fixed opposition to said rotor with said coil 24 disposed between said back yoke 38 and said rotor so as to define a magnetic circuit outside said sleeve 14 and said shaft 16 (Figs.1-3).

Hall does not teach: 1) a continuous waveform stator coil which is coreless; 2) that the sleeve and shaft are configured to form a radial aerodynamic bearing; and 3) that first and second magnets are respectively connected to the sleeve and shaft and configured to form an axial thrust bearing.

Regarding feature (1), Sedgewick teaches a coreless "torquer" stator coil comprising a continuous waveform 20 (Figs.3-4). Sedgewick's coil provides a multi-pole, single- or multi-phase coil array with a self-supporting structure with reduced manipulation during manufacture (c.2:12-17).

Regarding features (2) and (3), Murabe teaches a spindle motor including a stationary sleeve 13 and a rotating shaft 12 (Fig.3) with grooves formed in the sleeve and/or the shaft (Figs.5A-5C) to thus provide a radial dynamic pressure or "aerodynamic" [sic] bearing as a means of supporting the shaft (c.3:36-38; c.7:5-10). Murabe further teaches first and second magnets 15/18 and 16/19 respectively connected to said sleeve 13 and said shaft 12 and configured to form an axial thrust bearing (c.3:36-38 & 44-57; Fig.3).

It would have been obvious to modify Hall and provide a continuous waveform coreless stator coil per Sedgewick to provide a multi-pole, single- or multi-phase coil array with a self-supporting structure with reduced manipulation during manufacture, and further to provide a radial aerodynamic bearing between sleeve and shaft and first and second magnets forming an axial thrust bearing per Murabe since these respective elements would have been desirable to support the shaft radially and axially.

Regarding claim 29, the rotor in Hall, i.e. magnets 22, is disposed radially inward of the coil and the yoke 38 radially outward (Fig.1).

Regarding claims 30 and 34, in Murabe Fig.3 first and second magnets 15 and 16 are arranged at a lower end of said shaft 12, said first magnet 15 is disposed in an annular recess in an interior bottom portion of said sleeve (formed by sleeve 13 and base 11, Fig.3) and said second magnet 16 is fixed to a bottom of said shaft 12.

Regarding claims 32 and 36, the first and second magnets in Murabe are concentric, radially opposing one another, and provide axial thrust by attraction (Fig.2, c.3:51-65).

Regarding claim 33, the rotor in Hall, i.e. magnets 22, is disposed radially outward of the coil and the yoke 38 radially inward (Fig.1) when the rotor is taken to comprise the outer magnets.

5. Claims 31 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hall et al. (US 4,731,554), Sedgewick (US 4,331,896) and Murabe et al. (US 6,307,295) as applied to claims 30 and 34 above, further in view of Sung et al. (US 6,618,214). None of the motors of Hall, Sedgewick or Murabe are specifically used to drive color wheels.

Sung teaches a motor (not shown) for driving a color wheel (c.2:11-13).

It would have been obvious to employ the motor of Hall, Sedgewick or Murabe to drive a color wheel per Sung since motors are desirable to drive the color wheel.

Allowable Subject Matter

6. Claims 21-23, 25-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Regarding claims 21 and 25, the prior art, in particular Murabe does not teach, inter alia, that the first magnet 18 is disposed in a concavity of an inside surface of a top portion of said hub member 17 above said upper part of said shaft 12.

Response to Arguments

7. Applicant's arguments with respect to claims 19-36 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jeong (US 6,340,854) teaches a motor including a stationary sleeve 20 and unitary sintered bearing 70 with grooves 71, wherein the sleeve/bearing (20/70) and the shaft form a radial dynamic pressure or "aerodynamic" [sic] bearing as a means of supporting the shaft (c.3:45-c.4:15; c.4:54-57).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Burton S. Mullins whose telephone number is 571-272-2029. The examiner can normally be reached on Monday-Friday, 9 am to 5 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service

Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Burton S. Mullins
Primary Examiner
Art Unit 2834

bsm
16 July 2007